

Patent Application of  
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for  
**Micromachined Structures made by Combined Wet and Dry Etching**

**RELATED APPLICATIONS**

**[0005]** The present application claims the benefit of priority from copending provisional patent applications 60/269,011 filed on 2/14/2001 and 60/269,010 and which are hereby incorporated by reference.

**FIELD OF THE INVENTION**

**[0010]** The present invention relates generally to micromachining. More particularly, the present invention relates to a new method for combining directional ion etching and anisotropic wet etching. The present invention is particularly applicable to silicon micromachining.

**BACKGROUND OF THE INVENTION**

**[0015]** Silicon optical bench chips often have anisotropically etched grooves for holding optical fibers or other components. Also, SiOB chips can have dicing saw cuts that function as fiber stops, thereby providing passive longitudinal alignment for an optical fiber. Such optical bench chips are well known in the art.

**[0020]** In some cases, it is not desirable or practical to have dicing saw cuts. Particularly, dicing saw cuts can be undesirable because they typically must extend across an entire wafer.

**[0025]** It would be an advance in the art to provide fiber stops in optical bench chips without requiring dicing saw cuts.

**[0030]** Also, it would be an advance in the art of micromachining to provide a wider array of precision-made structures. Particularly, it would be advance to combine multiple micromachining techniques to provide unusual, useful structures.

#### **DETAILED DESCRIPTION**

**[0035]** The present invention provides novel micromachined structures made by combined wet/dry etching. The structures can be used in a variety of micromachined devices, including microoptical submounts and the like.

**[0040]** It will be clear to one skilled in the art that the above embodiment may be altered in many ways without departing from the scope of the invention. Accordingly, the scope of the invention should be determined by the following claims and their legal equivalents.